

Appendix A

Input Data

P	Q	R	S	NOT P	NOT Q	NOT R	NOT S
FALSE	FALSE	FALSE	FALSE	TRUE	TRUE	TRUE	TRUE
FALSE	FALSE	FALSE	FALSE	TRUE	TRUE	TRUE	FALSE
FALSE	FALSE	FALSE	TRUE	TRUE	TRUE	FALSE	TRUE
FALSE	FALSE	FALSE	TRUE	TRUE	TRUE	FALSE	FALSE
FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	TRUE	TRUE
FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	TRUE	FALSE
FALSE	TRUE	TRUE	FALSE	TRUE	FALSE	FALSE	TRUE
FALSE	TRUE	TRUE	TRUE	TRUE	FALSE	FALSE	FALSE
TRUE	FALSE	FALSE	FALSE	FALSE	TRUE	TRUE	TRUE
TRUE	FALSE	FALSE	FALSE	FALSE	TRUE	TRUE	FALSE
TRUE	FALSE	FALSE	TRUE	FALSE	TRUE	FALSE	TRUE
TRUE	FALSE	FALSE	TRUE	FALSE	TRUE	FALSE	FALSE
TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	TRUE	TRUE
TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	TRUE	FALSE
TRUE	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	TRUE
TRUE	TRUE	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE

Term 1

R and not S	Not R and S	Not R and Not S	Disjunctive of first three	Q and Disjunctive	Results of first term P and previous column
FALSE	FALSE	TRUE	TRUE	FALSE	FALSE
FALSE	TRUE	FALSE	TRUE	FALSE	FALSE
TRUE	FALSE	FALSE	TRUE	FALSE	FALSE
FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
FALSE	FALSE	TRUE	TRUE	TRUE	FALSE
FALSE	TRUE	FALSE	TRUE	TRUE	FALSE
TRUE	FALSE	FALSE	TRUE	TRUE	FALSE
FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
FALSE	FALSE	TRUE	TRUE	FALSE	FALSE
FALSE	TRUE	FALSE	TRUE	FALSE	FALSE
TRUE	FALSE	FALSE	TRUE	FALSE	FALSE
FALSE	FALSE	FALSE	FALSE	FALSE	FALSE
FALSE	TRUE	FALSE	FALSE	FALSE	FALSE
FALSE	FALSE	TRUE	FALSE	TRUE	TRUE
FALSE	FALSE	FALSE	TRUE	TRUE	TRUE
TRUE	FALSE	FALSE	TRUE	TRUE	TRUE
FALSE	FALSE	FALSE	FALSE	FALSE	FALSE

Second Term
Results of Second Term
P and not Q and not R and not S

FALSE
FALSE
FALSE
FALSE
FALSE
FALSE
FALSE
FALSE
FALSE
TRUE
FALSE
FALSE
FALSE
FALSE
FALSE
FALSE
FALSE

Term 3	Q and		Disjunctive of		Results of Third Term	
	R and not S	Q and not R and not S	first two	Not P and Disjunctive		
	FALSE	FALSE	FALSE	FALSE		
	FALSE	FALSE	FALSE	FALSE		
	FALSE	FALSE	FALSE	FALSE		
	FALSE	FALSE	FALSE	FALSE		
	FALSE	TRUE	TRUE	TRUE		
	FALSE	FALSE	FALSE	FALSE		
	TRUE	FALSE	TRUE	TRUE		
	FALSE	FALSE	FALSE	FALSE		
	FALSE	FALSE	FALSE	FALSE		
	FALSE	FALSE	FALSE	FALSE		
	FALSE	FALSE	FALSE	FALSE		
	FALSE	FALSE	FALSE	FALSE		
	FALSE	TRUE	TRUE	FALSE		
	FALSE	FALSE	FALSE	FALSE		
	TRUE	FALSE	TRUE	FALSE		
	FALSE	FALSE	FALSE	FALSE		

Combined Terms Constituting the Schema

Term 1	Term 2	Term 3
FALSE	FALSE	FALSE
FALSE	FALSE	FALSE
FALSE	FALSE	FALSE
FALSE	FALSE	FALSE
FALSE	FALSE	TRUE
FALSE	FALSE	FALSE
FALSE	FALSE	TRUE
FALSE	FALSE	FALSE
FALSE	TRUE	FALSE
FALSE	FALSE	FALSE
FALSE	FALSE	FALSE
FALSE	FALSE	FALSE
TRUE	FALSE	FALSE
TRUE	FALSE	FALSE
TRUE	FALSE	FALSE
FALSE	FALSE	FALSE

Schema Results

Disjunctive of all three terms

FALSE
FALSE
FALSE
FALSE
TRUE
FALSE
TRUE
FALSE
TRUE
FALSE
FALSE
FALSE
TRUE
TRUE
TRUE
FALSE

Simplified Equivalent Circuit

Q and not S	P and S
FALSE	FALSE
FALSE	FALSE
FALSE	FALSE
FALSE	FALSE
TRUE	FALSE
FALSE	FALSE
TRUE	FALSE
FALSE	FALSE
FALSE	FALSE
FALSE	TRUE
FALSE	FALSE
FALSE	TRUE
TRUE	FALSE
FALSE	TRUE
TRUE	FALSE
TRUE	FALSE
FALSE	TRUE

P and S and not R	Output of Simplified Logic	Disjunctive of first and third terms
FALSE	FALSE	FALSE
FALSE	FALSE	FALSE
FALSE	FALSE	FALSE
FALSE	FALSE	FALSE
FALSE	FALSE	TRUE
FALSE	FALSE	FALSE
FALSE	FALSE	TRUE
FALSE	FALSE	FALSE
FALSE	FALSE	FALSE
TRUE	TRUE	TRUE
FALSE	FALSE	FALSE
FALSE	FALSE	FALSE
FALSE	FALSE	TRUE
TRUE	TRUE	TRUE
FALSE	FALSE	TRUE
FALSE	FALSE	TRUE
FALSE	FALSE	FALSE

Output of Full Logic	Output of Simplified Logic
FALSE	FALSE
FALSE	FALSE
FALSE	FALSE
FALSE	FALSE
TRUE	TRUE
FALSE	FALSE
TRUE	TRUE
FALSE	FALSE
TRUE	FALSE
FALSE	TRUE
FALSE	FALSE
FALSE	FALSE
TRUE	TRUE
TRUE	TRUE
TRUE	TRUE
FALSE	FALSE

Appendix B

The truth-tables for the schemata **S** and **S*** exhibit the same profile of 1 and 0 as outputs, and are therefore logically equivalent.

pq rs	S: $[-p(qr-s) \vee q-r-s) \vee p-q-rs \vee [p(q(r-s \vee -rs \vee -r-s))]]$				S*: $q-s \vee p-rs$	
1111		0			0	
1110			1		1	
1101				1	1	
1100				1	1	
1011		0			0	
1010		0			0	
1001		1				1
1000		0			0	
0111		0			0	
0110	1					
0101		0			0	
0100			1		1	
0011		0			0	
0010		0			0	
0001		0			0	
0000		0			0	